The Maryland Fruit Grower

August, 1935

Maryland State
Horticultural Society

FRUIT THINNING OF YELLOW TRANSPARENT APPLES

A. Lee Schrader, Pomologist, University of Maryland.

There seems to be no question that *mature bearing trees* of Yellow Transparent in Maryland must have the crop thinned in order to obtain fruits of marketable size. However, *young trees* usually get credit for the production of good-sized fruits, and hence receive no thinning. One could well ask the question, would it *pay* to thin young Transparent trees? Here is some evidence.

In connection with some biennial bearing studies on nine year old Yellow Transparent, forty-eight of these trees were thinned in mid-June, 8 to 12 inches between fruits, which removed 427 fruits per tree, or approximately 65 per cent of the fruits originally on the tree. The thinned trees alternated with unthinned trees in each of 12 tree rows. At harvest time, the pickers were instructed to pick fruits, no smaller than 2″ in diameter. The results in yield of field crates and the percentages of sizes actually packed out are presented in the table, comparing 48 thinned trees with 48 unthinned trees.

	Yield in Bushels			Per cent of sizes—1st picking		
Treatment	1st picking July 9-10	2nd picking July 15-16	Total	2½″ up	2¼″ to 2½″	2″ to 2¼″
Thinned	54.3	12.3	66.6	43	31	20
Unthinned	49.3	24.5	73.8	20	25	55

Considering the effect on yields, the total yield was reduced about 10 per cent by thinning, but at the same time about 10 per cent more fruit was picked in the first picking from the thinned trees, so that the greater yield of unthinned trees resulted from the second picking which, from the unthinned trees, was largely (about 75 per cent) small fruits, 2″ — 2¼″ size. Thus the slight loss of yield is compensated for in the better first picking from thinned trees, and the fact that the loss was largely small fruit. The small second picking of the thinned trees had less than 30 per cent of small-sized fruit.

If we look at the increase in size of fruit resulting from thinning, the figures above show a large increase in the more marketable sizes, which can easily be translated in terms of a good profit above the cost of thinning. Most of the unthinned fruit fell in the smaller sizes.

Another effect of thinning lies in the improved vigor of the trees, and the possibility of making a young Transparent tree bear annual crops if the first crops are thinned, and the annual thinning is early and sufficiently heavy. This experiment has this object in view.

INTRODUCING THE LODI APPLE

A variety of apple, originated at the New York (Geneva) Agricultural Experiment Station in recent years was planted in 1926 in the experimental orchard of the Horticultural Department at College Park. These trees started bearing a few fruits in 1929 and bore a crop of 5 to 6 bushels per tree in 1935 which packed out 70 per cent of the fruits above 2½″, although the trees received no thinning. Yellow Transparent trees adjacent of the same age averaged 1½ bushels per tree and much smaller size even with thinning. The fruits resemble Yellow Transparent (the parentage is Montgomery x Yellow Transparent) and make apple sauce at least as good in quality. Unless the variety shows serious weaknesses in the future it looks like a promising variety for Maryland. The fruits ripen a little ahead of Transparent.

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MOISTURE AND ORGANIC MATTER

Mr. A. H. Teske, Extension Horticulturist of Virginia Writes:

"An ample supply of plant food and an adequate supply of soil moisture are absolutely necessary in producing satisfactory yields of apples that have high color, good size and good quality. The last four years have demonstrated clearly the important part that water plays in developing size and color in apples. A good supply of available moisture means better tree condition, better vigor, growth and foliage.

"Since there are only a relatively few orchard owners in Virginia who have access to a sufficient amount of water for irrigation, most growers will have to depend upon some system of soil management to provide the trees with the necessary soil moisture.

"It may interest growers to know how much water is used by an apple tree in making a year's growth and producing a crop of fruit. About 500 pounds of water are taken up by the roots of an apple tree for each pound of dry matter produced. A 30-year-old apple tree will produce about 33 pounds of dry weight in the formation of new wood, roots and leaves. A crop of 6 bushels of fruit would mean another 42 pounds of dry weight making a total of 75 pounds of dry matter per tree in a season. A tree producing 75 pounds of dry matter would require 37,500 pounds or almost 19 tons of water a year. The average planting distance in Virginia for apples, is about 33 feet by 33 feet, or 40 trees to the acre. Forty trees with a crop of 6 bushels per tree would take up 760 tons of water in a year.

"When we consider that 50 per cent of the water that falls is lost through run-off and percolation and add to this the amount lost from evaporation we find that at least two-thirds of the water that falls as rain escapes before the roots can take it up. If the soil is low in organic matter or if methods of management are poor an even greater proportion of the water may be lost before the trees have an opportunity to use it, and serious damage may be done. In fact, that is what has happened in many orchards previous to and following the drought of 1930.

"In the past the sod and sod mulch system of soil management has been most widely used in Virginia. When properly handled it is well suited to foothill orchards and those located on rough sloping sites. Continuous sod culture is not the best system for many orchards, especially if handled in a careless way and without some change. This is evidenced by the heavy loss of trees in orchards of the upper valley and other apple growing sections that have been under the sod system for some time and more apparent where the trees are planted on high ground; on hillsides where erosion has been heavy; on thin gravelly soils; on shallow shales and on shallow soils with limestone outcrops. Heavy losses also have taken place in orchards where clean cultivation has been practiced for some time. Under both of these common systems of orchard soil management, the trees suffered from lack of water-holding capacity of the soil and available plant food.

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"In the past the sod and sod mulch system of soil management has been most widely used in Virginia. When properly handled it is well suited to foothill orchards and those located on rough sloping sites. Continuous sod culture is not the best system for many orchards, especially if handled in a careless way and without some change. This is evidenced by the heavy loss of trees in orchards of the upper valley and other apple growing sections that have been under the sod system for some time and more apparent where the trees are planted on high ground; on hillsides where erosion has been heavy; on thin gravelly soils; on shallow shales and on shallow soils with limestone outcrops. Heavy losses also have taken place in orchards where clean cultivation has been practiced for some time. Under both of these common systems of orchard soil management, the trees suffered from lack of water-holding capacity of the soil and available plant food.

"Contrast this with the results obtained in an orchard in Shenandoah county during this same period but under cover crop system of management that began in the spring of 1930. This orchard is on thin high ground, the soil being gravelly clay loam, thirsty in nature, and low in organic matter. A very considerable amount of washing had taken place with good sized gullies in various parts of the orchard. For the most part the trees were small for their age, had made but little growth in previous years and yields had been very low.

"Beginning with 1930 the treatment has been as follows: In the spring the trees received four pounds nitrate per tree. Soybeans were sown in June with 100 pounds to the acre of a 2-12-2 fertilizer. In early fall the soybeans were disked down and rye for a winter cover was sown immediately; 200 pounds of an 0-13-6 fertilizer were put on at the time of sowing the rye. Five thousand two hundred barrels of apples were harvested.

"In 1931 the trees received 4 pounds of nitrate. The rye was disked down in the spring and soybeans were sown in June with 200 pounds to the acre of an 0-12-5 fertilizer. In early fall the soybeans were disked in and the orchard was seeded to rye. Three thousand eight hundred barrels of apples were harvested.

"In 1932 no fertilizer was applied to the trees. The orchard was seeded with a mixture of sweet clover, red clover and lespedeza. In the spring the rye was mowed and allowed to remain as mulch. Eight thousand five hundred barrels of apples were harvested.

"In 1933 no fertilizer was applied to the trees. The lespedeza reseeded and lime to the extent of 48 tons was applied. Four thousand two hundred barrels of apples were harvested.

"In 1934, the trees received 4 pounds of nitrate in the spring. The orchard was seeded to sweet clover, 75 pounds of 2-12-4 fertilizer per acre was applied at that time. Nine thousand barrels of apples were harvested. There was a good stand of lespedeza and this was disked down lightly in late November.

"Briefly, results of this soil management system are as follows: Approximately 28 tons of fertilizer were used on the trees and cover crops during the year. Five cover crops have been worked in the soil during the five years. Thirty thousand seven hundred barrels of apples have been harvested which is an average of 6,120 barrels per year or 102 barrels per acre for five years.

"It will be noted that there has been a consistent steady increase in yields. The trees are making splendid growth. The physical condition of the soil has been greatly improved and the washing of the soil has been largely checked. The location of the orchard, type of soil and previous condition of the orchard make it favorable to winter injury, yet to my knowledge, there is no evidence of damage from low temperature. Not only has the material from the cover crops added a large amount of active organic matter to increase the plant supply of the soil, but it has served to increase the moisture holding capacity of the soil.

"As has already been mentioned, one of the most important functions of a cover crop is to reduce the run-off and prevent erosion or washing of the soil. This is becoming of greater importance in orchards each year because of the increased use of larger and heavier spraying equipment and more

frequent spray applications. With such heavy equipment moving up and down between the tree rows, a large number of times during the season, the soil becomes packed down to a depth of several inches to such an extent in these spray lanes, that it almost resembles a paved way impervious to water and which forms an unobstructed path down which it may move with more speed, increasing run-off washing. Lespedeza is well suited for checking washing in such cases and in gullies because of its ability to become established on bare and hard places.

"To gain a real knowledge of the value of cover crops in protecting orchards against the loss of fertility from erosion we need to know what part of our orchard soils contain the largest amount of organic matter and plant food. It is of interest to know that the organic matter in the second 6 inches of soil is only about one-half as high as in the first six inches. This is, if the first 6 inches show an organic content of 2 per cent, the second six inches will show an organic content of but 1 per cent. This means that whenever washing takes place we are losing the richest and most fertile soil.

"We also found that many of these soils contained a high per cent of gravel. Some running over 10 per cent gravel. It can readily be seen that the amount of water that such soil is capable of holding even though it contains a good supply of organic matter will be far less than a soil carrying 5 per cent of gravel and less organic matter. In fact, with some of the soils, the water holding capacity of the soils with low gravel content and less organic matter was double that of the soils carrying a higher per cent of gravel. With this data in mind, it is very apparent why some orchards produce better than others; why some orchards have suffered less from drought; why the thin and shallow soils need more careful treatment than the deeper soils, and why it is more important that they carry a protective cover at all times. Any cover that will retard the movement of water over the surface of the soil will aid in checking the damage from washing.

"Another function of cover crops in apple production is their use in taking up excess moisture and plant food in late summer and early fall in order that the apple trees may mature and ripen their wood in a normal way so that winter injury may be prevented. A winter cover of rye is especially suited for this purpose as well as to prevent loss of nitrates through leaching.

"In this connection, I have some very interesting figures which show how efficient a winter cover of rye is in preventing loss of soluble plant foods by leaching and in preventing water loss through percolation. This data was furnished by Mr. Hill of the Agricultural Chemistry Department of V. P. I., who is carrying on some experiments with cover crops along this line. It will be noted from the following data that the nitrate loss from rye tanks was 1.52 pounds per acre while the loss from the fallow control tank was 17.6 times greater. These figures are even more significant in view of the fact that the check plot or fallow control tank received no fertilizer while in preparing the tank for the seeding of the rye, 400 pounds of 4-12-4 fertilizer were added with the nitrogen in the fertilizer being in the form of nitrate of soda. The rye crop is also conserving water, as the water loss through percolation from the fallow control tank is over twice as great as from the rye treated tank.

"First percolates after the applications of fertilizer.

RYE ABOUT 5 INCHES IN HEIGHT, December 1, 1934

Treatment	Amount percolate in grams	Nitrate nitrogen in grams per tank	Nitrogen in pounds per acre	Nitrate of Soda Equivalent
Rye-lespedeza	8,450	.0424	1.54	9.2
Rye-cowpeas	11,300	.0565	2.06	12.4
Rye-cowpeas	8,472	.0424	1.54	9.2
Rye-lespedeza	8,425	.0421	1.53	9.2
Rye-lespedeza	6,600	.0300	1.09	6.5
Rye-lespedeza	8,450	.0423	1.54	9.2
Rye but not turned under	7,400	.0370	1.35	8.1
Control	22,100	.7359	26.77	160.6

"The average loss from the rye tanks was 1.52 pounds per acre. The loss from the fallow control tank is 17.6 times greater. The rye crop is also conserving the water as the loss from fallow control tanks is over twice as great as the rye treated tanks.

"These tanks were prepared for rye by adding 400 pounds of 4-12-4 fertilizer per acre, the nitrogen being in the form of nitrate of soda.

"There are many crops and combination of cover crops that are satisfactory for use in the apple orchard. The kind that is best suited to your particular orchard will depend upon a number of factors such as the age and condition of the trees, the type and condition of the soil and perhaps to a less extent upon whether it is the *on* or *off*, year for the orchard, Most of the cover crops have advantages and disadvantages. Of the legumes, there is no cover crop that will equal sweet clover in producing organic material. Because of its strong roots, it has the ability to penetrate impervious soils, providing a means for water to pass to the lower soil layers and to distribute organic matter to greater depths as the roots die and decay. The disadvantage of this crop if not handled properly is that it makes a heavy growth at a time when trees need, and are drawing heavily on the water and food supply. If it is kept mowed down this disadvantage is largely overcome. It is more costly to seed and, on poor and thin soils, it is more difficult to get a stand. It is also somewhat of a mouse hazard. The lower growing, smaller stemmed yellow varieties are preferred for orchard use.

"Lespedeza is especially suited for the thinner soils. Its further advantages are that it makes but little growth in the spring when trees draw heavily on nitrates and moisture. Its thick mat-like growth retards water movement over the surface of the soil. Later in the season as growth thickens and increases in height the lower leaves are shed forming a fine layer of mulch on the ground which aids in reducing evaporation of moisture from the surface of the soil. The leaf mulch is also important in that it helps to maintain a lower and more uniform temperature in the soil. It makes a velvet-like carpet on which fruit may drop without serious bruising. Its greatest disadvantage is that it is a serious fire hazard during the late fall and winter. Being an annual, shedding its leaves in late summer and drying in the late fall and winter, there may be some leaching of nitrates. This, however, can be overcome by light disking in the fall after the seed has ripened, and sowing rye. In this way not only will the fire hazard be overcome, but a second crop

of organic matter produced from moisture and foods that would otherwise be lost at a time when there is no competition with the trees.

"Applying nitrogen fertilizers to apple trees has become a general practice with most growers. It is only the occasional grower who has realized the importance of applying fertilizers to his cover crops. The time, however, has arrived when growers must give serious thought to including applications of fertilizers to cover crops in their soil management program. I believe it a most economical procedure in view of the fact that the incorporation of organic matter is the only practical way available to most growers for maintaining an adequate and uniform moisture supply for their trees.

". . . Perhaps you may be interested in some of the results which we have for this section where we tried several kind and mixtures on a cover crop of lespedeza.

"The orchard in which this work is being carried on is located on a clay loam soil, the site is rolling with good air drainage. The trees are about fourteen years old. The land is low in fertility from cropping and in some places there is some outcropping of rock. There are six plots in this demonstration.

"On the check plot which did not receive any fertilizers the stand was very poor, many bare spots and very poor growth. Plot 2 received 50 pounds of nitrate of soda and 100 pounds of 16% acid phosphate which gave a very good crop. Plot 3 received 100 pounds of nitrate of soda and 200 of acid phosphate. Plot 4 received 150 pounds of 16% acid phosphate. Plot 5 received 140 pounds of 4-8-7. Plot 6 received 200 pounds of 2-8-7. On all the fertilizer plots the lespedeza made a splendid growth but in addition other clovers and grasses came in and the addition of these have provided active covers. Plots 3 and 6 are outstanding. No. 3 is about one-third better than No. 6, and about twice as good as any of the other plots which received fertilizer."

RED YORKING APPLE

Since those days when blushing red apples began to appear, we heard rumors of a red York. Now the Red Yorking has appeared. This red "bud sport" appeared in the H. W. Allison orchard near Shippensburg, Pa., on a tree that came from Harrisons' Nurseries. It is described as of typical York size and shape, but of early red color. This variety has been patented by Harrisons' Nurseries and three other partners, under Plant Patent No. 125, May 28, 1935. The patent gives Harrisons the exclusive right to propagate, advertise, and sell this variety in the United States and territories for a period of seventeen years.

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LOOK OVER YOUR PICKING EQUIPMENT **NOW**
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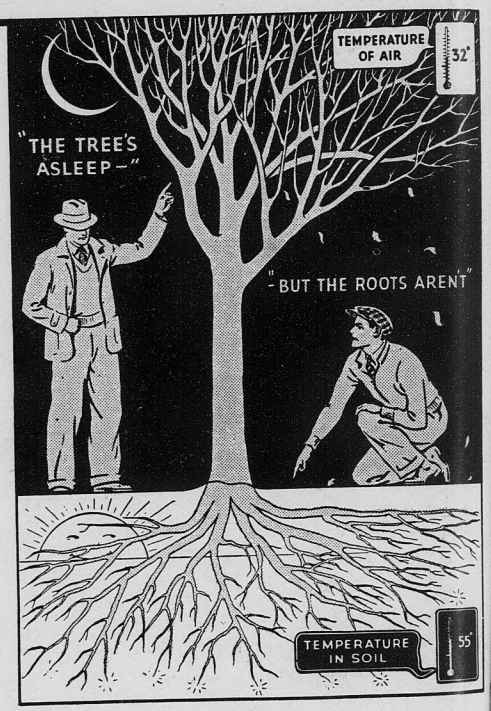

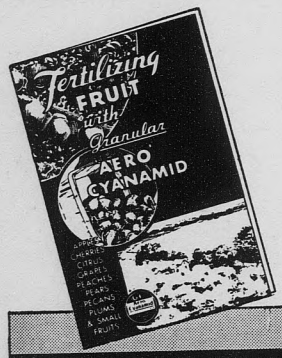

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